Part II. Preparation of $LiFePO_4$ from the $Fe_3(PO_4)_2$ of Part I.

$$Li_3PO_4 + Fe_3(PO_4)_2 \rightarrow 3\ LiFePO_4$$

On page 39, please rewrite the paragraph beginning on line 15 and ending on line 19 to read as follows.

Reaction 4. Formation of $LiFe_{0.9}Zn_{0.1}PO_4$ ($LiFe_{1-y}Zn_yPO_4$) from Fe_2O_3

$$0.5\ Li_2CO_3 + 0.45\ Fe_2O_3 + 0.033\ Zn_3(PO_4)_2 + 0.933\ (NH_4)_2HPO_4 + 0.45\ C \rightarrow LiFe_{0.9}Zn_{0.1}PO_4 + 0.5\ CO_2 + 0.45\ CO + 1.866\ NH_3 + 1.4\ H_20$$

In the Claims:

Please Cancel Claims 1 – 37.

Please add the following new Claims 42 – 134.

42. (New) A compound having the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is at least one transition metal from Groups 4 to 11 of the Periodic Table and has a +2 valence state; MII is at least one metallic element which is from Group 2, 12, or 14 of the Periodic Table and has a +2 valence state; and $0 < y < 1$.

43. (New) A compound of Claim 42 having an olivine structure.

44. (New) A compound of Claim 42, wherein $0 < y \leq 0.5$.

45. (New) A compound of Claim 44, wherein $0 < y \leq 0.2$.

46. (New) A compound of Claim 42, wherein MI is selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof.

47. (New) A compound of Claim 46, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof.

48. (New) A compound of Claim 42, wherein MII is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof.

49. (New) A compound of Claim 48, wherein MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

50. (New) A compound of Claim 43, wherein MI is selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y \leq 0.5$.

51. (New) A compound of Claim 50, wherein MI is selected from the group consisting of Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof; and MII is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof.

52. (New) A compound of Claim 50, wherein MI is selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof; and MII is selected from the group consisting of Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof.

53. (New) A compound of Claim 50, wherein MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

54. (New) A compound of Claim 53, wherein MI is selected from the group consisting of Fe, Co, and mixtures thereof.

55. (New) A compound having the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof; and $0 < y \leq 0.2$.

56. (New) A compound represented by the nominal formula:

$$LiFe_{1-y}M_yPO_4$$

wherein M is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y < 1$.

57. (New) A compound of Claim 56, wherein $0 < y \leq 0.5$.

58. (New) A compound of Claim 57, wherein $0 < y \leq 0.2$.

59. (New) A compound of Claim 58, wherein $0 < y \leq 0.1$.

60. (New) A compound of Claim 56, wherein M is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

61. (New) A compound of Claim 60 wherein M is Mg.

62. (New) A compound of Claim 61 having the nominal formula $LiFe_{1-y}Mg_yPO_4$, wherein $0 < y \leq 0.5$.

63. (New) A compound of Claim 62, wherein $0.2 \leq y \leq 0.5$

64. (New) A compound of Claim 63 having the nominal formula $LiFe_{0.8}Mg_{0.2}PO_4$.

65. (New) A compound of Claim 62 wherein $0.1 < y < 0.2$

66. (New) A compound of Claim 62, wherein $0 < y \leq 0.1$.

67. (New) A compound of Claim 66 having the nominal formula $LiFe_{0.9}Mg_{0.1}PO_4$.

68. (New) A compound of Claim 60, wherein M is a mixture of metals selected from the group consisting of Mg, Ca, Zn, and Ba.

69. (New) A compound of Claim 66, wherein M is Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof.

70. (New) A compound of Claim 69, wherein M is selected from the group consisting of Ca, Zn, and mixtures thereof.

71. (New) A compound of Claim 70, wherein M is Ca.

72. (New) A compound of Claim 71 having the nominal formula $LiFe_{1-y}Ca_yPO_4$, wherein $0 < y \leq 0.2$.

73. (New) A compound of Claim 72 having the nominal formula $LiFe_{0.9}Ca_{0.1}PO_4$.

74. (New) A compound of Claim 72 having the nominal formula $LiFe_{0.8}Ca_{0.2}PO_4$.

75. (New) A compound of Claim 70 wherein M is Zn.

76. (New) A compound of Claim 75 having the nominal formula $LiFe_{1-y}Zn_yPO_4$, wherein $0 < y \leq 0.2$.

77. (New) A compound of Claim 76 having the nominal formula $LiFe_{0.9}Zn_{0.1}PO_4$.

78. (New) A compound of Claim 76 having the nominal formula $LiFe_{0.8}Zn_{0.2}PO_4$.

79. (New) A compound of Claim 56 which has an olivine structure.

80. (New) An electrode comprising a compound of Claim 42.

81. (New) An electrode comprising a compound of Claim 50.

82. (New) An electrode comprising a compound of Claim 55.

83. (New) An electrode comprising a compound of Claim 56.

84. (New) An electrode comprising a compound of Claim 60.

85. (New) An electrode comprising a compound of Claim 64.

86. (New) An electrode comprising a compound of Claim 67.

87. (New) An electrode comprising a binder; an electrically conductive carbonaceous material; and an active material which is an olivine compound having the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is at least one transition metal from Groups 4 to 11 of the Periodic Table and has a +2 valence state; MII is at least one metallic element which is selected from Groups 2, 12, and 14 of the Periodic Table and has a +2 valence state; and $0 < y < 1$.

88. (New) The electrode of Claim 87, wherein MI is selected from the group consisting of V, Cr, Mn, Fe, Co, Cu, and mixtures thereof.

89. (New) The electrode of Claim 87, wherein MII is selected from the group consisting of Mg, Ca, Ba, Zn, and mixtures thereof.

90. (New) An electrode comprising a binder; an electrically conductive carbonaceous material; and an active material having the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y < 1$.

91. (New) An electrode of Claim 90, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof; and $0 < y \leq 0.2$.

92. (New) An electrode of Claim 91, wherein MI is selected from the group consisting of Co, Mn, Cu, V, Cr, and mixtures thereof; and MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

93. (New) An electrode of Claim 91, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof; and MII is selected from the group consisting of Ca, Zn, Ba, and mixtures thereof.

94. (New) An electrode of Claim 91 having the nominal formula $LiFe_{1-y}Mg_yPO_4$.

95. (New) A compound of Claim 91 having the nominal formula $LiCo_{1-y}Mg_yPO_4$.

96. (New) An electrode comprising a binder; an electrically conductive carbonaceous material; and an active material having the nominal formula $LiFe_{1-y}M_yPO_4$, wherein M is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y < 1$.

97. (New) An electrode of Claim 96, wherein $0 < y \leq 0.2$.

98. (New) An electrode of Claim 97, wherein said active material has the nominal formula $LiFe_{1-y}Mg_yPO_4$.

99. (New) An electrode of Claim 98, wherein said active material has the nominal formula $LiFe_{0.9}Mg_{0.1}PO_4$.

100 (New) An electrode of Claim 98, wherein said active material has the nominal formula $LiFe_{0.8}Mg_{0.2}PO_4$.

101. (New) An electrode of Claim 97, wherein said active material is a single phase compound having the nominal formula $LiFe_{1-y}Ca_yPO_4$.

102. (New) An electrode of Claim 101, wherein said active material has the nominal formula $LiFe_{0.9}Ca_{0.1}PO_4$.

103. (New) An electrode of Claim 101, wherein said active material has the nominal formula $LiFe_{0.8}Ca_{0.2}PO_4$.

104. (New) An electrode of Claim 97, wherein said active material has the nominal formula $LiFe_{1-y}Zn_yPO_4$.

105. (New) An electrode of Claim 104, wherein said active material has the nominal formula $LiFe_{0.9}Zn_{0.1}PO_4$.

106. (New) An electrode of Claim 104, wherein said active material has the nominal formula $LiFe_{0.8}Zn_{0.2}PO_4$.

107. (New) An electrode of Claim 96, wherein said active material has an olivine structure.

108. (New) A lithium battery comprising:

(a) a first electrode comprising an active material which is an olivine compound represented by the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is at least one transition metal from Groups 4 to 11 of the Periodic Table and has a +2 valence state; MII is at least one metallic element which is selected from Groups 2, 12, and 14 of the Periodic Table and has a +2 valence state; and $0 < y < 1$;

(b) a second electrode which is a counter-electrode to said first electrode; and

(c) an electrolyte between said electrodes.

109. (New) A lithium battery of Claim 108 wherein said first electrode is a cathode, and said second electrode is an insertion anode.

110. (New) A lithium battery of Claim 109, wherein said second electrode comprises a metal oxide, metal chalcogenide, carbon, graphite, and mixtures thereof.

111. (New) A lithium battery of Claim 109 wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof.

112. (New) A lithium battery of Claim 109 wherein MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

113. (New) A lithium battery comprising:

(a) a first electrode comprising an active material which is an olivine compound represented by the nominal formula $LiMI_{1-y}MII_yPO_4$, wherein MI is selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Sn, Ti, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y \leq 1$;

(b) a second electrode which is a counter-electrode to said first electrode; and

(c) an electrolyte between said electrodes.

114. (New) A lithium battery of Claim 113, wherein said first electrode is a cathode, and said second electrode is an insertion anode.

115. (New) A lithium battery of Claim 114, wherein said second electrode comprises a metal oxide, metal chalcogenide, carbon, graphite, and mixtures thereof.

116. (New) A lithium battery of Claim 114, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof; MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof;
and $0 < y \leq 0.2$.

117. (New) A lithium battery of Claim 116, wherein MI is selected from the group consisting of Co, Mn, Cu, V, Cr, and mixtures thereof; and MII is selected from the group consisting of Mg, Ca, Zn, Ba, and mixtures thereof.

118. (New) A lithium battery of Claim 116, wherein MI is selected from the group consisting of Fe, Co, Mn, Cu, V, Cr, and mixtures thereof; and MII is selected from the group consisting of Ca, Zn, Ba, and mixtures thereof.

119. (New) A lithium battery of Claim 116, wherein said active material has the nominal formula $LiFe_{1-y}Mg_yPO_4$.

120. (New) A lithium battery of Claim 116, wherein said active material has the nominal formula $LiCo_{1-y}Mg_yPO_4$.

121. (New) A lithium battery comprising:

(a) a first electrode comprising an active material represented by the nominal formula $LiFe_{1-y}M_yPO_4$, wherein M is selected from the group consisting of Mg, Ca, Zn, Sr, Pb, Cd, Sn, Ba, Be, and mixtures thereof; and $0 < y < 1$;

(b) a second electrode which is a counter-electrode to said first electrode; and

(c) an electrolyte between said electrodes.

122. (New) A lithium battery of Claim 121, wherein said first electrode is a cathode, and said second electrode is an insertion anode.

123. (New) A lithium battery of Claim 122, wherein said second electrode comprises a metal oxide, metal chalcogenide, carbon, graphite, and mixtures thereof.

124. (New) A lithium battery of Claim 122, wherein $0 < y \leq 0.2$.

125. (New) A lithium battery of Claim 124, wherein said active material has the nominal formula $LiFe_{1-y}Mg_yPO_4$.

126. (New) A lithium battery of Claim 125, wherein said active material has the nominal formula $LiFe_{0.9}Mg_{0.1}PO_4$.

127. (New) A lithium battery of Claim 125, wherein said active material has the nominal formula $LiFe_{0.8}Mg_{0.2}PO_4$.

128. (New) A lithium battery of Claim 124, wherein said active material is a single phase compound having the nominal formula $LiFe_{1-y}Ca_yPO_4$.

129. (New) A lithium battery of Claim 128, wherein said active material has the nominal formula $LiFe_{0.9}Ca_{0.1}PO_4$.

130. (New) A lithium battery of Claim 128, wherein said active material has the nominal formula $LiFe_{0.8}Ca_{0.2}PO_4$.

131. (New) A lithium battery of Claim 124, wherein said active material has the nominal formula $LiFe_{1-y}Zn_yPO_4$.

132. (New) A lithium battery of Claim 131, wherein said active material has the nominal formula $LiFe_{0.9}Zn_{0.1}PO_4$.

133. (New) A lithium battery of Claim 131, wherein said active material has the nominal formula $LiFe_{0.8}Zn_{0.2}PO_4$.

134. (New) A lithium battery of Claim 121, wherein said active material has an olivine structure.